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BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY'S

SOUTHERN REGION

LIST OF PUBLICATIONS AND PATENTS

January-June 1952

Single copies of available reprints may be obtained upon request. Copies of patents may be purchased from the U. S. Patent Office, Washington, D. C.

Southern Regional Research Laboratory, New Orleans, La.

Sugarcane Products Laboratory, Houma, La.

Tung Oil Laboratory, Bogalusa, La.

Naval Stores Station, Olustee, Fla.

Citrus Products Laboratory, Winter Haven, Fla.

Food Fermentation Laboratory, Raleigh, N. C.

Fruit and Vegetable Products Laboratory, Weslaco, Texas

Southern Regional Research Laboratory
2100 Robert E. Lee Boulevard
New Orleans 19, Louisiana

BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY'S

SOUTHERN REGION

The Southern Regional Research Laboratory was authorized by Congress in 1938 as one of four regional laboratories to develop new and extended outlets for farm crops. It is a unit of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

The U-shaped brick building, located on a 40-acre tract of land donated by the City of New Orleans, and containing nearly 4 acres of floor space, was completed in 1941.

The crops studied are cotton lint, cottonseed, rice, sweetpotatoes, sugarcane, peanuts, and other oilseeds grown in the South. The Laboratory also is headquarters for six field stations investigating citrus and other fruits, cucumbers and other vegetables, tung fruit, sugarcane, and pine gum. The States served are Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas.

Developments at the Southern Laboratory--many of which have been put to work for the farmer and industry--include a new machine for opening and fluffing bales of cotton before cleaning for spinning at textile mills; a loom attachment for weaving naturally waterproof cotton fabrics; acetylated cotton highly resistant to mildew, rot, and heat; a "disappearing" cotton yarn, strong enough to weave but soluble in water; information demonstrating that dyed and printed fertilizer bags have re-use value in making wearing apparel; an improved elastic bandage; a machine to cut short-staple cotton and cotton wastes into a linter-like product; improved methods for extracting Southern oilseeds; information to aid peanut butter manufacturers; processing data on fibers and glues from cottonseed and peanut protein, oil from rice bran, and starch from sweetpotatoes; plus many advances in the knowledge of chemistry, physics, and engineering.

Research at field stations has contributed to commercialization of frozen citrus concentrates and fresh-pack cucumber pickles; and to improvements in pine gum processing that have modernized the naval stores industry.

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No.

COTTON

Fiber and Fundamental Investigations

1 BLAIR, MARY GRACE, and REEVES, RICHARD E.
GLUCONIC ACID FROM HYPOIODITE OXIDIZED HYDROCELLULOSE. Amer. Chem. Soc. Jour. 74(10): 2608-2609. 1952.

Hypoiodite-oxidized hydrocellulose was subjected to methanolysis; the residual hydrochloric acid was neutralized by diazomethane; and most of the glucosides were removed by direct crystallization. The oxidized residue thus concentrated was isolated as D-gluconic phenythydrazide and as D-gluconic amide and the methylamide. Twenty-one % of the carboxyl indicated by analytical methods to be in the original oxycellulose was accounted for by isolation from the alcoholysate; most of the remainder was found in the insoluble residue from the methanolysis where it existed in an unesterified form, either as free acid or as lactone. D-Gluconic methylamide was prepared in 95% yield by the reaction of the γ-lactone in a cold methanolic solution of methylamine. Analyses and the higher melting point indicate that the preparation has greater purity than that previously described by van Wijk.

2 BUSBY, H. S., and WARD, W. L.
COTTON FILLED STRUCTURAL MATERIAL AND PROCESS OF PREPARING THE SAME. U. S. Patent No. 2,587,591: March 4, 1952.

The materials are prepared by mixing: cotton fibers; a catalytic amount of a peroxide, such as benzoyl peroxide; and a diallyl ester of a polybasic acid, such as maleic acid, maintaining the mixture at an elevated temperature until the cotton fibers swell, adding a polymerizable vinyl chloride resin, allowing the resultant mixture to gel, removing the solvent, and further polymerizing the gel.

3 CROW, JULIA H., and CONRAD, CARL M.
VISCOSITY MEASUREMENTS (THEIR VALUE TO COTTON). Textile Indus. 116(5): 110-111, 121. 1952.

Cupriethylene is used as the solvent in an improved method of measuring the viscosity of cellulose to make the determination more applicable to cotton. This solvent is less volatile than cuprammonium hydroxide, the solvent in the usual methods. Another advantage is that the new test method specifies conditions that make the kind of viscometer to be used unimportant.

No.

4 FISHER, C. H.
EVALUATION TOOLS IN COTTON UTILIZATION RESEARCH. South. Textile News 8(6): 68,71. 1952.

Some contributions made at the Southern Laboratory and elsewhere in research on improving the use of cotton through the application of existing tools for the evaluation of cotton fiber, yarn, and fabric and through modifications of these tools are described.

5 GUIFFRIA, RUTH, and TRIPP, VERNE W.
EFFECTS OF TENSION ON THE SWELLING OF COTTON FIBERS. Textile Res. Jour. 22(1): 21-25. 1952.

Microscopic measurements showed that the cross-sectional area of cotton fibers tensioned in water and other media increased significantly over that brought about by water-swelling alone. With immersion without tension in urea solution, ethylamine, or sodium hydroxide of mercerizing strength, followed by removal of the reagent and drying, area and circularity of fibers increased, compared to untreated fibers; but with tensioning during immersion the circularity increased, but the area decreased, with respect to the untensioned fibers. The elongation of fiber bundles tensioned in the various media was measured, and was greatest in sodium hydroxide solution.

6 HONOLD, EDITH, POYNOT, JANICE., and CUCULLU, ALVA F.
HEAT-RESISTANCE OF PARTIALLY ACETYLATED COTTON FABRICS. Textile Res. Jour. 22(1): 25-29. 1952.

Specimens of commercial sheeting -- unacetylated and acetylated (17.4%, 23.4%, and 28.7% acetyl)-- were heated at 160°C. (320°F.) in dry, oxygen-free nitrogen, in dry air, in water vapor, and in a mixture of water vapor and air for varying periods of time. In nitrogen, the loss of breaking strength by acetylated fabrics was less than 3%, in air it was 4-7%, in water vapor 4-8%, and in air and water vapor mixture, 8-16%, in comparison with losses for the unacetylated controls of 24%, 46%, 82%, and 83%. Losses in elongation at break tended to parallel losses in breaking strength. No measurable quantity of acetyl was lost from the acetylated fabrics during heating. After heating and reconditioning, all the fabrics showed a slight decrease in weight and in percentage of moisture regain, and a slight increase in thickness.

7 ORR, ROLLIN S., HUMPHREYS, GERALDINE C., and GRANT, JAMES N.
INFLUENCE OF CROSS-SECTIONAL SHAPE OF RAW COTTON ON DIMENSIONAL CHANGES IN MERCERIZATION WITHOUT TENSION. Textile Res. Jour. 22(2): 89-93. 1952.

The relation of the cross-sectional shape of the raw fiber to the changes that occur upon mercerization without tension was studied for a number of cotton varieties representing a wide range of maturities. Perimeters and diameters of fiber cross sections were measured by the use of an especially designed instrument. Areas also were measured. The percent increase in area and the percent decrease in perimeter caused by loose mercerization were dependent upon the original cross-sectional shape; flat fibers shrank more in perimeter and increased more in area than did round fibers. This was partly explained as being due to a change toward circularity.

8 PONS, WALTER A., JR., and HOFFPAUIR, CARROLL L.
COLORIMETRIC DETERMINATION OF THE pH OF COTTON FIBER. Textile Res. Jour. 22(3): 200-202. 1952.

A colorimetric method for the determination of the pH of cotton fiber, involving the direct application of neutralized sulfonphthalein indicators, dissolved in 25% isopropyl alcohol, to the fiber, gives a close approximation of the actual pH of cotton fiber. The pH is determined by reference to color standards prepared from buffered cottons containing the same relative amounts of cotton and indicator solution.

9 ROLLINS, MARY L.
THIS THING CALLED COTTON. Cotton Gin and Oil Mill Press. 53(9): 14,16-17, 36-37. 1952.

Microscopical studies which show the complex structure of cotton are described. Nine illustrations -- photomicrographs and electron microscope photographs -- show gross and fine features of the cell wall structure. The fibrils of the primary wall (isolated from the fiber by beating in water) range from 1/40 to 1/25 micron in diameter and are randomly oriented. The secondary wall cellulose, composed of fibrils of approximately the same dimensions as those of the primary wall, has a closely packed parallel arrangement, which accounts for the tremendous strength of cotton.

10 SCHUYTEN, H. A., WEAVER, J. W., FRICK, J. G. JR., and REID, J. DAVID.
FORMATION OF CELLULOSE ETHERS IN WATER-REPELLENCY TREATMENT OF COTTON WITH STEARAMIDOMETHYLPYRIDINIUM CHLORIDE. Textile Res. Jour. 22(6): 424-432. 1952.

The chemical reactions which take place between cotton cellulose and stearamidomethylpyridinium chloride and of any compounds that form from this chloride in the treating bath or on cloth under the usual treating conditions were studied. Stearamidomethylpridinium chloride and each of the possible compounds were synthesized and applied separately to the cloth in a manner as similar as possible to the commercial treatment. Stearamidomethylpyridinium chloride reacted with cellulosic hydroxyl groups to produce a stearamidomethyl ether of cellulose. Substitutions of 1 stearamidomethyl group per 150 anhydroglucose units were obtained. The permanent water-repellency obtained on treatment of cotton fabrics with amidomethylpyridinium salts is due to this reaction.

No.

11 TRIPP, VERNE W., CONRAD, CARL M., and MARES, TRINIDAD.
SOME RELATIONS BETWEEN INTRINSIC AND SPECIFIC VISCOSITY IN CELLULOSE SOLUTIONS AT A CONTROLLED VELOCITY GRADIENT.
Jour. Phys. Chem. 56(6): 693-696. 1952.

Empirical equations relating the specific viscosity determined at a constant velocity gradient and at two convenient concentrations (0.25 and 0.50 g./dl.) with the intrinsic viscosity have been derived for solutions of cellulose in cuprammonium and cupri-ethylenediamine hydroxides. Use of the relations requires adjustment of viscosity data to a mean velocity gradient of 500 sec. $^{-1}$ whenever the cellulose has an intrinsic viscosity greater than 5 or 6, the difference depending on solvent used.

12 FELO, L. A., ZIIFLE, H. M., and LOEB, L.
SWELLING CAPACITIES OF FIBERS IN WATER. PART I. DESICCATION RATE MEASUREMENTS. Textile Res. Jour. 22(4): 254-261. 1952.

The swelling capacities of cotton and other fibers have been determined by measuring the rate of loss of moisture from a moisture-saturated sample (rate of desiccation) as follows: Fully swollen samples containing excess water, were dried very slowly and weighed periodically. The maximum regain values, when expressed in terms of volume increases, agree with the swelling capacities as determined by microscopic measurements; but the long drying periods required make this method suitable mainly for use in research when time is not an important consideration.

13 WELO, L. A., ZIIFLE, H. M., and McDONALD, A.W.
SWELLING CAPACITIES OF FIBERS IN WATER. PART II. CENTRIFUGE STUDIES. Textile Res. Jour. 22(4): 261-273. 1952.

In the centrifuge technique, the swelling capacity of cotton and other fibers appears as a function of the moisture retention after swelling and centrifuging. The complication of dealing simultaneously with the time and speed of centrifuging was avoided by noting that straight lines (to a high degree of approximation) were obtained when moisture regains were plotted against the squares of rotational speeds. The intercept values were the same and were reproducible for any selected centrifuging time of 20 minutes or more, provided the minimum acceleration was above 3,200 g. The zero-speed intercepts on the moisture regain axis did not represent true swelling capacities. Nevertheless, the technique could be useful for detecting and measuring differences in water-holding capacity brought about by chemical treatment. A quantitative theory of the behavior of the fiber-water system in the centrifuge was developed, based on simple capillary considerations.

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Mechanical Processing

14 FIORI, LOUIS A., and OSER, LOUISE F.
THE IMPORTANCE OF CORRECTING RANGE VALUES ON THE USTER UNIFORMITY TESTER. Textile Indus. 116(1): 149,151,153,169. 1952.

This article presents data to show that with use of the range method with the Uster uniformity tester it is necessary to apply correction factors to the range values to eliminate machine and product variables. Otherwise, it is hard for textile mills to get results with one Uster tester comparable to those obtained with another. The effects of not correcting are compared with results when corrections are made and these effects are illustrated in charts. Also described is a method whereby an estimated average line can be used in place of the integrator average value reading.

15 KYAME, GEORGE J.
EXPERIMENTAL SLASHER FOR TEXTILES EMPLOYS GAS, INFRARED DRIER. Indus. Gas. 30(10): 12-13, 31-32. 1952.

This gas-fired, infrared drier, for use in a textile slasher, is an elongated, double-walled structure, which in longitudinal cross-section resembles a smoker's pipe. Four burners provide control over the intensity of the infrared radiation reaching the warp. It is possible that the unit, which is patented may be the basis of low-cost, high-production slashing equipment. In a mill, 4 such driers, each 57 inches wide, might consume about 125,000 cu. ft. of gas per 24-hour day for drying sized warps. Engineering details may be obtained by writing the Southern Regional Research Laboratory.

16 SIMPSON, J., LANDSTREET, C. B., and CORLEY, J. R.
AN EVALUATION OF LONG-AND SHORT-TERM VARIATIONS IN SLIVER AND ROVING. Textile Res. Jour. 22(1): 42-48. 1952.

To study the effects of processing variables on product uniformity, a procedure for evaluating uniformity has been developed. Two types of variation, long-and short-term, are common in slivers, rovings, and yarns. By measuring only short-term variation it was possible to study the effects of doubling and drafting on product uniformity; to develop drafting curves by which product variability may be predicted; and to develop a formula for the comparison of the variation in unequal counts of roving and yarn.

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Chemical Processing

17 COOPER, ALBERT S., VOORHIES, SAMUEL T., JR., BURAS, EDMUND M., JR., and GOLDTHWAIT, CHARLES F.
PARTIAL ACETYLATION OF COTTON. Textile Indus. 116(1): 97-102, 194-195. 1952.

Processes are described for partially acetylating a yard or two of cotton cloth at a time, or small amounts of raw stock or loose yarn on a laboratory apparatus; for treating 50 lb. lots of raw stock in a small stainless steel kier, and treating singles and other low-twist yarns, thread, twine, cord, net, and raw stock on a 6-lb. dyeing machine; and for treating fabric on a dye jig. A dyeing test is used to determine qualitatively the uniformity of the treatment within a sample of any desired size. The cost of acetylating is probably, on a weight basis, about half the cost of the average gray goods.

18 DAUL, G. C., and REID, J. D.
METHOD OF MAKING PARTIALLY CARBOXYMETHYLATED OR PHOSPHORYLATED CELLULOSIC FIBROUS MATERIALS CREASE RESISTANT AND DYE RESISTANT. U. S. Patent No. 2,584,114; February 5, 1952.

The method comprises impregnating the materials with an acid-polymerizable substance, such as a melamine-formaldehyde precondensate, and heating to polymerize the latter, in the absence of an added external catalyst. The method produces cloths which are free of acid-induced degradation and possess excellent hand, abrasion resistance, and other properties.

19 DAUL, G. C., and REID, J. D.
PENTAERYTHRITYL PHOSPHORIC ACID ESTERS OF CELLULOSE AND PROCESS OF MAKING THE SAME. U. S. Patent No. 2,592,544; April 15, 1952.

The esters are made by impregnating cellulose fibers, preferably cotton fibers in the form of a cloth, with an aqueous solution of a phosphoric acid ester of pentaerythritol or a urea or ammonium salt of such an ester, e.g., pentaerythrityl tetrakis (diammonium orthophosphate), and heating the impregnated fibers to from 130° to 160°C. The esters are cellulosic ion-exchange materials characterized by an unusually high free phosphoric acid-group content.

20 GUTHRIE, JOHN D.
ATTACHMENT OF DYES TO COTTON BY ETHER LINKAGE. Presented before the Dyeing Group of the 30th. Ann. Convention in New York, October 17, 1951. Amer. Dyestuff Reptr. 41(1): 13-14, 30. 1952.

A method is described for coloring cotton by attaching certain azo dyes to the cellulose by ether linkage. The dyes contain the

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sulfatoethyl group and are reacted with cotton by curing in the presence of strong sodium hydroxide. Such dyes were prepared from 2-(p-aminophenoxy) ethylsulfuric acid. Cotton fabric colored by the process has outstanding washfastness. While the lightfastness is only fair, it is about equal to that of cotton fabrics dyed with commercial developed azo colors.

21 KEATING J. F., and KEATING, E. J.
PADDER MANGLE OR SQUEEZE ROLLS FOR IMPROVED EXTRACTION AND IMPREGNATION OF TEXTILE FIBERS, YARNS, AND FABRICS. U. S. No. 2,596,152: May 13, 1952.

The rolls have a rigid hard core covered with a layer of soft rubber, from about 1/16 to 1/4 inch in thickness, having a hardness of from about 100 to 200 as measured with a Pusey and Jones plastometer using a 1/8 inch bolt. The rolls cause a markedly greater penetration of liquid into interstices and cause an unusually complete removal of liquid from fibers, yarns, and fabrics.

22 KRAEMER, RITA, and GOLDTHWAIT, CHARLES F.
WHITES FROM CHLORINE AND PEROXIDE BOTH "PERMANENT". Textile World 102(3): 159,246. 1952.

A long-term test of the relative permanency of the whites obtained with chlorine and with peroxide bleaches was made in which samples were stored with and without access of light. The fabrics, whether bleached with chlorine or peroxide, retained their whiteness equally well under each storage condition.

23 WARD, K., JR., CONRAD, C. M., and SEGAL, L.
REDUCING THE CRYSTALLINITY OF NATIVE FIBROUS CELLULOSIC MATERIAL. U. S. Patent No. 2,580,491; January 1, 1952.

Invention relates to immersing the material in certain anhydrous liquid amines, preferably ethylamine, and then removing the amino with a nonpolar solvent, which lowers the crystallinity to about 25-35% without changing the x-ray pattern of the material from that of native cellulose.

OILSEEDS AND OTHER OIL-BEARING MATERIALS

Properties and Composition

24 LAMBOU, M. G., MAYNE, R. Y., PROCTOR*, B. E., and GOLDBLITH*, S. A.
EFFECTS OF HIGH-VOLTAGE CATHODE-RAY IRRADIATION ON COTTONSEED. Science 115(2984): 269-271. 1952.

Cottonseed has been irradiated with high-voltage cathode rays at dosages of 500,000 to 3,000,000 rep. At 1 to 2 million rep, the

* Food Technology Laboratories, Massachusetts Institute of Technology, Cambridge.

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internal and external microflora were destroyed. Concomitantly, however, a reduction in germination and an inhibition of growth of the seedlings occurred, proportional to the dosage of the rays. It is suggested that one or more enzymes associated with the normal phenomena of germinating and growing have been inactivated.

25 O'CONNOR, R. T., POMINSKI, C. H., HEINZELMAN, D. C., HOWELL, HILDA, and VON DER HAAR, PATRICIA.
INFLUENCE OF CONDITION OF SEED ON THE SPECTRAL PROPERTIES OF CRUDE AND PROCESSED HYDRAULIC COTTONSEED OILS. Amer. Oil Chem. Soc. Jour. 29(6): 220-224. 1952.

Ultraviolet and visible spectra of 7 crude hot- and cold-pressed hydraulic cottonseed oils and of the refined, bleached, and deodorized oils processed from them are illustrated and discussed. Diene conjugation was found, generally, to be greater in oils obtained by hot than by cold hydraulic pressing and in oils from seed stored for some time. Individual gossypol pigments varied more in character in hot-pressed than in cold-pressed oils. The spectrum of carotenes was masked in crude oils, especially in hot-pressed ones, but was apparent in refined oils. The carotenes were removed by bleaching. The deep red color, especially of oils from stored seed, is shown to be due to unidentified chromophores rather than to gossypurpurin. Absorption in the red region of the spectrum is attributed to pheophytin.

26 VON DER HAAR, PATRICIA, and POMINSKI, CATHERINE HALL.
PIGMENTS OF COTTONSEED. V. METHYLATION OF GOSSYPURPURIN. Jour. Organic Chem. 17(2): 177-180. 1952.

The methylation of gossypol gave the completely methylated ether, hexamethoxygossypol. Methylation of gossypurpurin produced an ether whose methoxyl value indicated the presence of 4 methyoxyl groups and which resisted further methylation. Molecular weight determinations on the two ethers showed the molecular size of the gossypurpurin methyl ether to be approximately twice that of hexamethoxygossypol. A tentative molecular formula for the gossypurpurin methyl ether was proposed on the basis of its elementary analysis, methoxyl value, and molecular weight.

Processing and Storage*

27 ALTSCHUL, A. M. CONDON, M. Z., and LAMBOU, M. G.
METHOD OF PREVENTING DETERIORATION OF SEEDS. U. S. Patent No. 2,584,972: February 12, 1952.

The method is particularly applicable to seed such as cottonseed containing natural enzymes and up to about 30% moisture, and comprises spraying the seed with a liquid chlorohydrin, such as ethylene chlorohydrin, in a concentration of from about 0.2 to 1.0%

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*See also items 58, 76, 81, 82

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based on the dry weight of the seed.

28 EAVES, P. H., MOLAISON, L. J., BLACK, C. L., CROVETTO, A. J., and D'AQUIN, E. L.
A COMPARISON OF FIVE COMMERCIAL SOLVENTS FOR EXTRACTION OF COTTONSEED. Amer. Oil Chem. Soc. Jour. 29(3): 88-94. 1952.

In pilot-plant-scale batch extraction of cottonseed, a comparison was made of benzene, ethylether, acetone, and butanone of commercial grade with commercial hexane as to effects on yield, composition, properties, and processing characteristics of the meals and the crude oils produced. None of the experimental solvents may be said to compare favorably with hexane, since any improvement in meal quality was achieved at the expense of oil quality, and the differences in yields were not such as to offset this loss in oil quality.

29 FREEMAN, A. F., and SINGLETON, W. SIDNEY.
PREVENTION OF OIL SEPARATION IN PEANUT BUTTER-A REVIEW. Peanut Jour. and Nut World. 31(4): 23,30, 45-46. 1952.

The methods used for preventing the separation of oil in peanut butter are reviewed and the history of the development of stabilization of peanut butter is discussed. Grinding roasted peanuts by various methods is discussed, especially with respect to the frictional heat which is imparted to the peanut butter and the amount of oil that is freed from the cell structure of the peanut. The effect of controlling the temperature during grinding and later is explained.

30 GASTROCK, E. A., D'AQUIN, E. L., and VIX, H. L. E.
FILTRATION EXTRACTION: A SIMPLIFIED SOLVENT EXTRACTION PROCESS. Cotton Gin and Oil Mill Press (Off. Proc. Fifty-Sixth Ann. Conv. Natl. Cottonseed Prod. Assoc., May 19-20, 1952) pp. 30,32,34,36,37. 1952.

Described is filtration extraction, a new process for extracting cottonseed, which is based on the use of a continuous, horizontal, vacuum filter, in which the oil is separated -- after cooked flakes have been soaked in a separate vessel in contact with the solvent. The solution of the oil is accomplished in a slurry mixing tank in 15 to 20 minutes; then the standard filtering unit is employed to separate the concentrated miscella from the meal and to wash the latter countercurrently with weaker miscellas, and finally with hexane. The liquid-solid separations and washings are performed by the use of vacuum. Flakes are conditioned with shorter cooking periods and at somewhat lower temperatures than usually used, the maximum being about 230°F. Moisture content is about 18% in the second ring of the cooker. The material is cooled, rerolled, and then crisped. Filtration-extraction apparently overcomes most of the problems inherent in conventional direct solvent

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extraction and in solvent extraction with prepressing. The process is promising for application to soybeans, peanuts, rice bran, and other oilseeds.

31 GRACI, A. V., JR., GARDNER, H. K., JR., CUCULLU, A. F., CROVETTO, A. J., SPADARO, J. J., and KNOEPFLER*, N. B.
PILOT PLANT DESOLVENTIZATION OF FINE COTTONSEED MEAL. Amer. Oil Chem. Soc. Jour. 29(2): 41-43. 1952.

Fine cottonseed meal, 300-mesh, was desolventized satisfactorily in a continuous pilot-plant meal dryer of the screw-conveyor type. The free gossypol content of the fine meal was lowered as much as 69% during the drying operation without appreciably affecting the protein solubility of the meal. A meal in granular form could be obtained, provided the feed material had certain physical characteristics.

32 GRACI, A. V., JR., CROVETTO, A. J., PARKER, J. S., and REUTHER, C. G., JR.
SOLVENT EXTRACTION OF COTTONSEED AND PEANUT OILS. IX. DETERMINATION OF FINES IN MISCELLA. Amer. Oil Chem. Soc. Jour. 29(2): 71-73. 1952.

Cottonseed, peanuts, okraseed, and rice bran were used in experiments in which was developed a rapid method of determining the solids content of oil-solvent miscellas. The method is volumetric and replaces the slower gravimetric method. The volumetric determination is converted to weight values by the use of an appropriate curve. The construction of the curve and its application in pilot-plant operations are described.

33 JENSEN*, EDITH A., LAMBOUR, J. S., LAMBOU, M. G., and ALTSCHUL, A. M.
RESEARCH ON THE STORAGE OF COTTONSEED. Cotton Gin and Oil Mill Press 53(5): 68-69, 84-85. 1952.

Information not available at the time of the 1950 report and progress made in 1951 are reported. Also, accomplishments during the tenure of fellowship are summarized. In 1951 studies have been made of two methods of handling--heat and fungicides--as complementary agents to chemical treatment to inhibit deterioration of cottonseed during storage.

34 KNOEPFLER*, NESTOR B., VIX, H. L. E., and THURBER, F. H.
RESEARCH ON PROCESSING PROCEDURES TO IMPROVE THE NUTRITIVE VALUE OF COTTONSEED MEAL. Cotton Gin and Oil Mill Press. 53(6): 61-66. 1952.

Progress made to date in an investigation of the processing conditions that would be suitable for the production of cottonseed meals

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* Fellow, National Cottonseed Products Association.

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of high nutritive value by fractionation, screw-pressing, hydraulic pressing, and solvent extraction is reported. This work was part of a broad program of revaluation of the nutritional value of cottonseed meals as affected by processing procedures, which is being conducted by this Laboratory in cooperation with the National Cottonseed Products Association, oil mills, and State, Federal, and private laboratories.

35 KROONEN, J. G., and FEUGE, R. O.
RE-REFINING COTTONSEED OIL AT HIGH RATES OF SHEAR. Amer. Oil Chem. Soc. Jour. 29(2): 65-71. 1952.

In re-refining cottonseed oils at high rates of agitation and shear color decreased as the rate of agitation increased until a rate was reached beyond which greater agitation had little effect. About 0.1% of sodium hydroxide was the minimum and 0.2% the optimum amount required to produce the maximum improvement in color at high rates of shear. With higher temperatures during re-refining color decreased; between 15° and 65°C. the removal of color was almost a linear function of the re-refining temperature.

36 MOLAISON, L. J., WELLBORN, W. A., and D'AQUIN, E. L.
SOLVENT EXTRACTION METHODS STUDIED. Tung World 6(11): 8,9,14. 1952.

Pilot-plant batch solvent extraction of shell-free tung kernels with commercial hexane yielded a sizeable quantity of light-colored, shell-free, defatted tung meal for use in research on its properties. The oil obtained was very light in color, of good quality, and met the A.S.T.M. specifications for tung oil.

37 POMINSKI, J., D'AQUIN, E. L., MOLAISON, L. J., McCOURTNEY, E. J., and VIX, H. L. E.
PRE-TREATMENT OF PEANUT KERNELS FOR EFFECTIVE SKIN REMOVAL. Amer. Oil Chem. Soc. Jour. 29(2): 48-51. 1952.

Optimum (pilot-plant-scale) conditions for approximately 98% skin removal from U. S. No. 1 shelled Spanish peanuts are water-treatment at room temperature, to gain not less than 20% moisture, drying with forced circulated air at 120° to 125°F. to approximately 4.5% moisture in the peanuts, and blanching in a standard split-nut blancher. Meal prepared by hexane extraction of de-skinned (98%), water-treated U. S. No. 1 kernels had color and flavor characteristics superior to other hexane-extracted peanut meals for food utilization. Protein prepared from this meal had a light color, equal to that produced from peanut kernels treated with 0.5% lye solution.

38 WILLICH, R. K., HALL, A. S., MORRIS, N. J., and FREEMAN, A. F.
PEANUT BUTTER. I. ROASTING, COOLING, BLANCHING, AND PICKING OF PEANUTS. Food Technol. 6(2): 71-73. 1952.

The times and temperatures required for roasting white Spanish peanuts from very light to very dark colors have been determined, and informa-

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tion has been obtained on the cooling, blanching, and manual sorting of 20 batches of peanuts in relation to their original moisture contents and to the quality of the final product.

39 WILLICH, R. K., MURRAY, M. D., O'CONNOR, R. T., and FREEMAN, A. F.
PEANUT BUTTER. II. EFFECT OF ROASTING AND BLANCHING ON THE THIAMINE CONTENT OF PEANUT BUTTER. Food Technol. 6(6): 199-200. 1952.

Analyses of raw, shelled peanuts after removal of the testa showed that most of the thiamine was contained in the kernel. Peanut butters made from peanuts roasted to various extents contained only a relatively small proportion of the thiamine originally present in the kernel. With increase of roasting the amounts of thiamine were progressively smaller, while the color of the product became darker. Consequently, color becomes a visual indication of the extent of roasting, and indirectly of the loss of thiamine.

Glyceride Oils and Fatty Acids

40 DOLLEAR, F. G.
STABILITY OF COTTONSEED AND PEANUT OILS TO AUTOXIDATION. Potato Chipper 11(11): 24,26,28,30,32. 1952.

The influence of the type and proportion of the various fatty acid components of the glycerides and the presence of natural or added antioxidants, of prooxidants, and of synergists and/or metal deactivators on the resistance of cottonseed and peanut oils to autoxidation has been studied. The stability of cottonseed and peanut oils can be increased by hydrogenation or by the addition of some types of antioxidants.

41 FEUGE, R. O., VICKNAIR, E. J., and LOVEGREN, N. V.
MODIFICATION OF VEGETABLE OILS. XII. PLASTICITY OF SOME ACETO DERIVATIVES OF MONOSTEARIN. Amer. Oil Chem. Soc. Jour. 29(1): 11-14. 1952.

Acetostearins were prepared by reacting various proportions of acetic anhydride with a monostearin of 99.2% purity, a commercially available monostearin containing 91.5% monoglycerides, and a technical grade monostearin containing 61% monoglycerides. The last product was prepared from a completely hydrogenated cottonseed oil. All the acetostearins tested were nongreasy solids at room temperature, yet were highly flexible. At 22°C. most of them could be stretched more than 800% under the test conditions. Some had good flexibility even at 4°. Depending on the purity of the monostearin used and the degree of acetylation, some products melted completely below body temperature (37°), and others at temperatures up to 60°. The temperature interval over which melting occurred was usually very short (1°-3°); however, products made from technical grade monostearin melted over the range 10°-20°C.

No.

42 MACK, C. H., MOORE, R. N., and BICKFORD, W. G.
EFFECT OF WINTERIZATION ON THE COMPOSITION AND STABILITY OF COTTONSEED OIL. Amer. Oil Chem. Soc. Jour. 29(1): 14-16. 1952.

The relations between tocopherol content, fatty acid composition, and autoxidative stability in a commercially refined and bleached cottonseed oil, in the same oil after winterization, and in the corresponding stearine press cake were investigated. The results indicated that an unsaturation of the glycerides increased and was accompanied by an increase in the tocopherol content of the winterized as compared to the unwinterized oil. The reverse was true of the stearine press cake. The changes in fatty acid composition and tocopherol content tended to counterbalance one another and to lead to the same final autoxidative stability in each product. The red and yellow color components of the products were unaffected by winterization.

43 MAGNE, FRANK C., and SKAU, EVALD L.
MOLECULAR COMPOUND FORMATION BETWEEN ACETAMIDE AND LONG-CHAIN SATURATED FATTY ACIDS. Amer. Chem. Soc. Jour. 74(10): 2628-2630. 1952.

Binary freezing point diagrams which have been constructed for each of the polymorphic forms of acetamide with lauric, myristic, palmitic and stearic acids give conclusive evidence of molecular compound formation between acetamide and each of these acids. The general formula for these compounds is $RCOOH.NH_2COCH_3$. Cryoscopic molecular weight determinations show that in dilute 1,4-dioxane solutions acetamide is 40.4% associated, myristic acid is not appreciably associated, and the equimolecular compounds of acetamide and the fatty acids are from 93.5 to about 97% dissociated, depending upon the chain length of the fatty acid.

44 MAGNE, FRANK C., HUGHES, EDWIN J., MOD, ROBERT R., and SKAU, EVALD L.
BINARY FREEZING-POINT DIAGRAMS FOR PALMITIC ACID WITH SUBSTITUTED ACETAMIDES AND OTHER AMIDES. Amer. Chem. Soc. Jour. 74(11): 2793-2795. 1952.

Complete binary freezing-point data were obtained for palmitic acid with the formamide, propionamide, n-butyramide, isobutramide, chloroacetamide, phenoxyacetamide, phenylacetamide, stearamide, and benzamide. All these systems except that with formamide proved to be of the simple, eutectic type. The system with formamide showed a region of immiscibility in the liquid state. Binary systems of palmitic acid with succinimide, malonamide, and urea showed regions of immiscibility in the liquid state. In none of the systems was there evidence of a molecular compound of palmitic acid with the amide, such as was found with acetamide.

45 MOORE, R. N., and BICKFORD, W. G.
A COMPARATIVE EVALUATION OF SEVERAL ANTIOXIDANTS IN EDIBLE FATS.
Amer. Oil Chem. Soc. Jour. 29(1): 1-4. 1952.

Thirteen compounds have been compared with respect to their antioxidant activity in concentrations of 0.01, 0.05, and 0.10% in edible cottonseed oil, the same oil hydrogenated to shortening consistency, and in lard which is essentially free of naturally occurring antioxidants. None of the compounds exhibited significant antioxidant activity in the cottonseed oils, when used in a concentration of 0.01%, but they were effective in stabilizing lard under these conditions. Propyl gallate was the most effective of the compounds tested for the vegetable fats.

46 PACK, F. C., PLANCK, R. W., DOLLEAR, F. G.
DETERMINATION OF THE TOTAL UNSATURATION OF TUNG OIL BY CATALYTIC HYDROGENATION. Amer. Oil Chem. Soc. Jour. 29(6): 227-228. 1952.

A relatively simple apparatus and the procedure for the catalytic hydrogenation as a quantitative method for the measurement of total unsaturation in tung oil and related products containing conjugated unsaturation are described. Hydrogen iodine values representing the total unsaturation in domestic and imported oils, alpha- and beta-eleostearic acids, the residual unsaturation in partially hydrogenated tung oils, and the unsaturation of other organic materials are reported.

47 SINGLETON, W. S., and GROS, AUDREY T.
DILATOMETRIC INVESTIGATIONS OF FATS. VI. MELTING DILATION AS A FUNCTION OF CHAIN LENGTH IN FATTY ACIDS AND THEIR GLYCERYL ESTERS.
Amer. Oil Chem. Soc. Jour. 29(4): 149-151. 1952.

Melting dilations have been determined for the even-numbered, saturated n-fatty acids in the series lauric through stearic, and some of their glyceryl esters. These data have been correlated with data obtained previously to determine the relation between melting dilation and the effective chain length of these compounds.

No.

43 STANSBURY, MACK F., and HOFFPAUIR, CARROLL L.
RELATION BETWEEN FATTY ACID COMPOSITION AND IODINE VALUE OF COTTONSEED OIL. Amer. Oil Chem. Soc. Jour. 29(2): 53-55. 1952.

The regularity in the increase in linoleic and in the decrease in oleic and saturated acids with increase in iodine value of cottonseed oils has been shown by obtaining the regression equation for the glyceride of each acid on the iodine value by use of the compositional data on 48 samples of oil ranging from 89.8 to 117.0 in iodine value. These equations offer a ready means of approximating the fatty acid composition of cottonseed oils from their iodine values.

49 SUAREZ, CARLOS, C., O'CONNOR, R. T., FIELD, E. T., and BICKFORD, W. G.
DETERMINATION OF SESAMOL, SESAMOLIN, AND SESAMIN IN SESAMIN CONCENTRATES AND OILS. Analyt. Chem. 24(4): 668-671. 1952.

A previously described method for the determination of free and bound sesamol and sesamin in sesame oil was modified to make it applicable in the analysis of sesamin concentrates. The sesamin concentrate was dissolved in a mixed solvent (chloroform-isooctane) and centrifugation was used in the phasic separation of free and bound sesamol to remove substances interfering with normal color development in the Villavecchia reaction.

50 WARD, T. L., and SINGLETON, W. S.
PHYSICAL PROPERTIES OF FATTY ACIDS. II. SOME DILATOMETRIC AND THERMAL PROPERTIES OF PALMITIC ACID. Jour. Phys. Chem. 56(6): 696-698. 1952.

Pure palmitic acid has been examined by dilatometric and calorimetric methods. The properties investigated and the values found were expansion of the acid in the solid and liquid states, 0.000280 and 0.000968 ml./g/°C., respectively; melting dilation, 0.1806 ml./g.; specific volume over the range of temperature from solid to liquid; specific heat; heat of fusion, 51.2 cal./g.(13.12 kcal. per mole); and entropy. Equations were developed for expressing the specific heat (Cp) of palmitic acid at any temperature (°C.): (solid state) $C_p = 0.3831 + 0.0013t$; (liquid state) $C_p = 0.4624 + 0.00175t$.

51 WARD, T. L., SINGELTON, W. S., and PLANCK, R. W.
THERMAL PROPERTIES OF FATS AND OILS. VIII. SPECIFIC HEATS, HEATS OF FUSION, AND ENTROPY OF ALPHA AND BETA TUNG OILS. Amer. Oil Chem. Soc. Jour. 29(4): 155-157. 1952.

Three different melting points of the *beta* tung oil were observed, each dependent upon the rate of cooling. Equations were developed to express in cals./g./°C. the specific heats of the stable forms of tung oil.

No.

Alpha tung oil
Solid state (-184° to -43°C.) $C_p = 0.404 + 0.001\ t$
Liquid state (9° to 80°C.) $C_p = 0.463 + 0.0011\ t$

Beta tung oil
Solid state (-178° to 27°C.) $C_p = 0.390 + 0.0013\ t$
Liquid state (67° to 87°C.) $C_p = 0.489 + 0.00016\ t$

The liquid glycerides present at any temperature in the melting range were estimated from the data for the heat contents of the oils. The rate of liquid phase formation at constant heat input of both alpha and beta tung oils, unlike that of cottonseed and peanut oils, increased sharply during the final 10° of the interval owing to the greater homogeneity of the glycerides of the former.

Meals and Proteins *

52 ALTSCHUL, A. M., and CASTILLON, L. E.
WATER-SOLUBLE COMBINATION PRODUCTS OF GOSSYPOL AND PROTEINS.
U. S. Patent No. 2,581,342; January 8, 1952.

The products are toxic to goldfish and are prepared by dissolving gossypol and proteins, such as peanut or casein proteins, in a basic aqueous medium, neutralizing, and freezing the medium, and removing the water by sublimation.

53 ALTSCHUL, A. M., and CASTILLON, L. E.
WATER-SOLUBLE COMBINATION PRODUCTS OF GOSSYPOL AND AMINO ACIDS.
U. S. Patent No. 2,582,949; January 22, 1952.

The combination products are toxic to goldfish but not to rats or mice, and are produced by dissolving gossypol and an amino acid, such as lysine, in a basic aqueous medium neutralizing, freezing the medium, and removing the water by sublimation.

54 ARTHUR, JETT C., JR., and MANY, HUGH G.
PEANUT PROTEIN FIBERS - FLOW CHARACTERISTICS OF SPINNING SOLUTIONS AFFECTED BY RATE OF EXTRUSION. Amer. Dyestuff Rptr. 41(13): 385-386. 1952.

In the preparation of peanut protein fiber the loss in head in a section of the extrusion system per unit volume of spinning solution delivered decreased with increasing rate of extrusion. This indicated that the fluidity of spinning solutions of peanut protein is affected by rate of extrusion. Consequently, an optimum rate of

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* See also items 45, 48.

No.

extrusion could be determined for each extrusion system to minimize the loss in energy in the system per unit volume delivered.

55 HEYWANG*, BURT W., BIRD*, H. R., and KUPPERMAN, R. P.
THE LOSS OR INACTIVATION OF PURE GOSSYPOL IN A MIXED DIET. Poultry Sci. 31(1): 35-39. 1952.

Most of the gossypol mixed with a diet (for poultry) at the .012, .024, and .036% levels was undetectable by chemical analysis after the mixtures had stood for several days. To learn whether the gossypol had been destroyed or rendered inactive for chickens, a 42-day experiment was conducted with four groups, each containing 10 White Leghorn pullets--selected because of the high hatchability of their eggs when all had been fed the basal diet containing no gossypol. During the 42 days, the basal diet contained pure gossypol mixed at the 0, .012, .024, or .036% levels. The mixed diets were fed on the sixth and seventh days after mixing. There was no decrease in hatchability with gossypol at the .012 and .024% levels, and only a slight decrease at the .036% level. There was no adverse effect on whole egg weight at any of the three levels.

56 HOFFMAN, WADE H., JR., and ARTHUR, JETT C., JR.
COTTONSEED MEAL AS A TIRE CORD-TO-RUBBER ADHESIVE. Rubber Age. 71(3): 354-356. 1952.

Methods of dispersing cottonseed meal to yield a good adhesive of the cord-to-rubber type have been investigated and the adhesive properties of cottonseed meal have been compared with those of casein. On a labratory scale, dips containing solvent-extracted cottonseed meal compared favorably with those containing casein. The viscosities of the former were higher than the latter, but were within a usable range for application to the cord.

57 HOGAN, JOSEPH T., and ARTHUR, JETT C., JR.
COTTONSEED AND PEANUT MEAL GLUES. RESISTANCE OF PLYWOOD BONDS TO CHEMICAL REAGENTS. Amer. Oil Chem. Soc. Jour. 29(1): 16-18. 1952.

The resistance of birch plywood glue bonds using cottonseed and peanut meal or casein to organic and inorganic reagents for periods ranging from 1 to 14 days was determined. It was suggested that the principal attractive forces involved in the protein bonds were ionic or valence forces and that differences observed in the resistance of the glues to the chemical reagents were probably due to variations in the amino acid constitution of the proteins.

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* Bureau of Animal Industry.

No.

58 POMINSKI, J., GORDON, W. O., McCOURTNEY, E. J., VIX, H. L. E., and GASTROCK, E. A.
PRODUCTION OF PEANUT PROTEIN. Indus. and Engin. Chem. 44(4): 925-928. 1952.

Improved pilot-plant yields of protein were obtained by successive peptizations and also by grinding the meal before one peptization. A continous, horizontal centrifuge was more effective than screens in separating and dewatering undissolved solids from peptized slurries to obtain a relatively clear effluent. Fines passing a 150-mesh screen inhibited the dewatering of spent meal residues by pressing. Pressed solids could be dried directly in a rotary dryer, while those containing fines had first to be mixed with dried material.

Miscellaneous

59 DOLLEAR, F. G., and ALTSCHUL, A. M.
SCIENTISTS REVIEW USDA'S TUNG PRODUCTS RESEARCH. FIND OPPORTUNITY FOR INVESTIGATION OF NEW TUNG PRODUCTS "ALMOST UNLIMITED". SAY ECONOMIC FACTORS WILL GOVERN DEVELOPMENTS. Tung World. 6(11): 6,7,13,14. 1952.

Accomplishments and progress being made in research on tung at this Laboratory and at its field station, the U. S. Tung Oil Laboratory, are reported. The work is directed toward greater use of tung products through improvements in methods of processing and handling, improvements of the properties of the oil and meal, and the development of new or expanded outlets. Some of the research is intended to be of immediate, practical benefit to the industry; some is fundamental research, intended to solve long-range problems.

60 MARKLEY, K. S.
VEGETABLE OILS' RISING PRESTIGE. Southwest Retort 4(4): 10-11. 1952. (Condensation of a talk made at the Southwest Regional Meeting, Amer. Chem. Soc., Austin, Texas, December 1951, as winner of the 1951 Southwest Regional Award.)

The following crops account for about 90 percent of all the vegetable oils of commerce: Coconut, peanuts, cottonseed, soybean, rape, mustard, linseed, olive, palm, sesame, sunflower, palm kernel, tung, and babassu. Production statistics are given for each of these materials. Research to realize the potentialities of sesame seed is mentioned.

61 PLANCK, RALPH W., PACK, FRANK C., and SKAU*, DOROTHY B.
ABSTRACT BIBLIOGRAPHY OF THE CHEMISTRY AND TECHNOLOGY OF TUNG PRODUCTS. 1875-1950. AIC-317. Processed.

Nearly 3000 articles and patents relating to the tung tree, the processing of its fruit, and the chemistry and technology of the oil and meal, which have appeared throughout the world over the past 75 years, have been compiled and abstracted. Volumes I and II cover two-thirds of the total 2233 articles and one-third of the 735 patents. Volume III covers the remaining articles and patents. Volume IV consists of an author index, a numerical index of patents, and a subject index.

RICE INVESTIGATIONS

62 LOEB, JOSEPHINE R., and MAYNE, RUTH Y.
EFFECT OF MOISTURE ON THE MICROFLORA AND FORMATION OF FREE FATTY ACIDS IN RICE BRAN. Cereal Chem. 29(3): 163-175. 1952.

The effect of moisture content on the growth of bacteria and of filamentous yeasts and molds in stored rice bran was compared with the effect on the formation of free fatty acids in the oil. High moisture content had a similar effect on microorganisms and on formation of free fatty acids, and both often increased at the same time in the same sample.

SUGARCANE AND DERIVED PRODUCTS

63 GUILBEAU, W. F., BLACK, C. L., and MARTIN, L. F.
A SECOND SEASON OF PILOT-PLANT PROCESSING OF SUGARCANE. Sugar Jour. 15(1): 15-17,20, 34-36. 1952.

Twenty-six samples, representing 10 different varieties of cane, were processed in the pilot-plant during the 1951 grinding campaign. Five varieties were tested as stubble cane during the early part of the season and later as plant cane. A much larger number of experiments on replicated samples would be necessary to establish the significance of minor differences; but major differences in behavior can be determined with sufficient accuracy to provide information on what may be expected in commercial processing of the canes tested. The larger volume of mud and lower processing rates to be expected from certain varieties, as compared to others, can be checked consistently, and was generally the same this season as last.

64 MARTIN, L. F., ROBINSON, H. M., and FAHS, F.J.
PROGRESS IN CANDY RESEARCH. REPORT NO. 25, PERIOD COVERED: Nov. 1, 1951 - MAY 31, 1952. Report on Utilization of Agricultural Products in Confectionery in Cooperation With the National Confectioners' Association. Processed by Natl. Confectioners' Assoc. 20 pp. 1952.

Research has been continued on (1) problems in the formulation of candies suitable for military rations, in cooperation with the Food Laboratories of the General Products Division of the Quartermaster; (2) the stabilization of fats in candies; (3) the modification of the texture of starch gums by emulsifiers of the type used in bakery products; (4) testing of new ingredients; and (5) further testing of an aceto-stearin as a slab dressing.

No.

65 WOLFROM*, M. L., BINKLEY*, W. W. and MARTIN, L. F.
MOLASSES-IMPORTANT BUT NEGLECTED PRODUCT OF SUGARCANE. Sugar 47(5): 33-35. 1952. Also in Internatl. Sugar Jour. 54(645): 249-250. 1952.

About 15% of the constituents of molasses are yet unknown. The application of modern analytical techniques, such as chromatography, in exploring this field is described, and some findings of a study of molasses composition (under a Research and Marketing Act contract with Ohio State University) are reported. The importance of the complex, highly polymerized, and yet uncharacterized substances in affecting every step in the manufacture of cane sugar, and in the development of new uses for molasses, is pointed out.

FRUIT AND VEGETABLE PRODUCTS

Citrus≠

66 FISHER, C. H., and MATCHETT, JOHN R.
PROCESSING AND UTILIZATION RESEARCH ON CITRUS FRUITS. Sixth Ann. Rio Grande Valley Hortic. Inst. Proc. 63-72. 1952.

At two field stations of the Southern Regional Research Laboratory, in Weslaco, Texas, and in Winter Haven, Florida, and at a field station of the Western Regional Research Laboratory in Pasadena, California, basic information has been obtained on problems involved in the pasteurization of canned juices and on the darkening and development of off-flavor during the processing and storage of the juices.

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* Ohio State University.
≠ See also items 78, 79.
Assistant Chief, Bureau of Agricultural and Industrial Chemistry.

No.

67 HUSKINS, C. W., SWIFT, L. J., and VELDHUIS, M. K.
CONSTITUTION OF THE LIPID FROM STORED VALENCIA ORANGE JUICE.
Food Res. 17(2): 109-116. 1952.

In lipids obtained from stored pasteurized Florida Valencia orange juice, the ratio of phosphorus to nitrogen was 1 to 2, and conjugated fatty acids increased while nonconjugated acids decreased. Considerable breakdown occurred in the lipid fraction during storage. The resin acids contained phthalic acid, whereas this acid was not found in freshly pasteurized juice lipid. From the analyses obtained, it would be difficult to predict the state of the lipid after storage.

68 MORGAN, DONALD A.
THERMAL CONDUCTIVITY IN ORANGE CONCENTRATE. Sixty-fourth Ann. Meeting, Fla. State Hortic. Soc. Proc. Pages 192-198. 1952.

The equations of unsteady state heating or cooling can be applied to 58.9° Brix orange concentrate for prediction of heating or cooling times, and also to the 42° Brix concentrate above its freezing point. The average value for the coefficient of thermal conductivity for 58.9° Brix concentrate was found to be 0.17 B.t.u. /hr./ sq. ft/°F./ft.; and for 42° Brix concentrate it was 0.18 B.t.u./hr./sq. ft./°F./ft.

69 PATRICK, ROGER.
SOURCES OF COLIFORM BACTERIA IN CITRUS JUICE FOR CONCENTRATES.
Sixty-fourth Ann. Meeting, Fla. State Hortic. Soc. Proc. Pages 178-181. 1952.

Possible sources of coliform bacteria in citrus juice concentrates were water for washing the fruit; exteriors of the fruit; juice from normal fruit, over-mature fruit, damaged fruit, and dried, over-mature fruit; scale insects; and fruit flies (Drosophila). The presumptive coliform tests and plate counts, which are given for 9 groups of samples, showed that coliforms were found on the exteriors of fruit infected with scale insects; in juice from damaged fruit; and from fruit flies in significant numbers.

No.

70 SWIFT, JAMES LYLE.
FATTY ACIDS OF THE LIPIDS FROM FRESHLY-CANNED FLORIDA VALENCIA ORANGE JUICE. Food Res. 17(1): Pages 8-14. 1952.

An analysis of the methyl esters of the fatty acids of freshly canned Florida Valencia orange juice was made by spectrophotometric method for the overall examination, and by application of distilled fractions for the saturated and palmitoleic esters. A considerable discrepancy was found in the percentages of saturated esters by the two methods.

71 SWIFT, JAMES LYLE.
ISOLATION OF β-SITOSTERYL-D-GLUCOSIDE FROM THE JUICE OF FLORIDA VALENCIA ORANGES (*CITRUS SINENSIS*, L.) Amer. Chem. Soc. Jour. 74(4): 1099-1100. 1952.

The aim was to identify the components of the steryl glycoside occurring in orange juice. The melting points of the glucoside, the tetraacetate, and tetrabenozoate were 298°, 171°, and 201°, respectively, and the specific rotations were -40.1°, -33.7°, and +1.59°. The glucoside was hydrolysed and the glucose identified by conventional methods. The melting points of the liberated β-sitosterol, the acetate, and benzoate were 137°-8°, 125°-6°, and 147°-8°, respectively, and the specific rotations were -38.2°, -40.3°, and -13.6°. These values were compared with those found by other investigators. Carbon and hydrogen percentages were determined on all the above-mentioned compounds except glucose, and agreed closely with the theoretical values.

72 SWIFT, JAMES LYLE.
FLAVOR CHANGES IN STORED CANNED ORANGE JUICE. Sixty-fourth Ann. 1951 Fla. State Hortic. Soc. Proc. Pages 181-185. 1952.

Two theories to account for the development of off-flavor in canned orange juice on storage were investigated: that off-flavors are due to changes in the d-limonene of the peel oil; and that they are due to changes in the lipid constitutents of the juice. At the present stage, peel oil was indicated as a source of the typical storage flavor and lipid constituents may also play a role. Further work is in progress.

Others

73 HUFFMAN, W. A. H., SCOTT, W. G., and LIME, B. J.
IDENTIFICATION OF SUGARS IN "RIO SWEET" CANTALOUPES. Sixth Ann. Rio Grande Valley Hortic. Inst. Proc. Pages 83-86. 1952.

In work at the U. S. Fruit and Vegetable Products Laboratory, D-sucrose, D-glucose, and D-fructose were detected, by means of paper chromatography, as constituent sugars in "Rio Sweet" cantaloupe, a new, disease-resistant variety developed at Substation No. 15 of the Texas Experiment Station. Acid hydrolysis revealed no additional sugars. Aqueous extracts gave the same qualitative results as 80% alcoholic extracts.

No.

PINE GUM AND DERIVED PRODUCTS

74 GOLDBLATT, L. A., McCONNELL, N. C., and SUMMERS, H. B., JR.
PINE GUM DISTILLATION. U. S. Patent No. 2,598,684: June 3, 1952.

The steam distillation of pine gum to produce turpentine is improved by passing the vapor stream through a zone packed with glass fibers. The improved process removes both water soluble and water insoluble acids from the vapor stream and readily produces turpentine having an acid number in the order of 0.1.

75 PATTON, E. L.
RESEARCH-THE KEY TO PROGRESS IN NAVAL STORES UTILIZATION. Flacs. Pages 3,5,6,8,9,11. 1952.

Information is given on the Olustee method of pine gum cleaning, on steam distillation of pine gum, improved marketing procedures, and other developments of naval stores research now in use by the industry. The numerous possibilities of rosin, turpentine, and the pine gum itself as raw materials for the chemical industry are being emphasized in present investigations.

76 ST. CLAIR, WILLIAM E., and LAWRENCE, RAY V.
FUSED ZINC RESINATES FROM ALDEHYDE-MODIFIED ROSIN. Indus. and Engin. Chem. 44(2): 349-351. 1952.

In the method presented, no trouble from "blocking" was encountered when an aldehyde was incorporated into the rosin prior to the reaction with a zinc compound. Resinates were clear, homogeneous, noncrystalline, and had good solubility in the common varnish solvents and improved resistance to oxidation. The fused zinc resinates may contain as much zinc as precipitated zinc resinates. Rosin derivatives of low acid number, such as rosin oil and ester gum when modified with aldehydes, can be reacted with zinc acetate to give hydrocarbon-soluble resins which may contain as much as 2 moles of zinc per mole of rosin derivative.

77 WAITE, E. P., COLLINS, D. N., and SUMMERS, H. B., JR.
PROMISING NEW PINE GUM PROCESS. Chem. Engin. 59(2): 199,201. 1952.

Maleo-pimaric acid is the white, crystalline addition product of maleic anhydride and the levo-pimaric acid in crude pine gum, made by diluting the crude gum with turpentine; filtering; removing the water, and reacting the cleaned gum with maleic anhydride. The crystalline adduct is separated from the liquid and centrifuged, washed, and dried. The acid number is 400 to 410 in 70% acetone solution; m. p. 220° to 225°C.; soluble in ether, alcohol, and aromatic solvents; insoluble in aliphatic hydrocarbons, water, and turpentine. In printing inks the acid produces brilliant and workable azo pigments. Esters of the acid are being tested as plasticizers and the acid soap as an emulsifier in synthetic rubber production.

No.

MISCELLANEOUS

78 DAUL, G. C., and REID, J. D.
PREPARATION OF PENTAERYTHRITYL PHOSPHATE. U. S. Patent No. 2,583,549; January 29, 1952.

Invention relates to novel compounds such as pentaerythrityl tetrakis (diammonium orthophosphate) made by heating mixtures of pentaerythritol and urea phosphate at from about 130° to 180°C. until the evoluation of water ceases. Such compounds form cellulose esters which are valuable ion-exchange materials.

79 FISHER, C. H., and CROW, JULIA H.
FOOD PROCESSING-A FIELD OF USDA RESEARCH ON CROP UTILIZATION IN THE SOUTH. South. Food Processor (Ann. Rev. No.) 1952.

Highlights in studies in 1951 on citrus fruits, cucumbers, sugarcane, peanut butter, and vegetable oils conducted at this Laboratory and at its field stations are reported.

80 FISHER, C. H.
UTILIZATION OF THE BY-PRODUCTS OF SOUTHERN AGRICULTURE. Jour. South. Res. 4(2): 16-19. 1952.

Progress in developing uses for agricultural by-products of the South as a means of overcoming problems associated with the disposal of residues and so-called waste materials is summarized, with examples drawn principally from the results of research at the four regional laboratories of the U. S. Department of Agriculture.

81 HOFFPAUIR, CARROLL L.
REPORT ON STARCH IN PLANTS. THE USE OF THE ANTHRONE REACTION. Assoc. Off. Agr. Chem. Jour. 35(2): 398-401. 1952.

The application of the anthrone reaction to the starch isolated by the Pucher procedure for the determination of starch in plants gave poor agreement among replicate determinations, possibly because of losses of starch in the purification stops or to degradation of starch during extraction. Unsatisfactory results obtained when a modification of the McCready method for starch in peas was applied to samples of buckwheat leaves, alfalfa, and peanut meal may have been due to interferences by such nonstarch constituents as polysaccharides, protein, and pigments.

82 REID, DAVID J., and JUNG, JULIUS R., JR.
A FLAT, ADJUSTABLE LANTERN SLIDE CARRIER. Science 115(2995): 577. 1952.

A flat, frame box with cover, which is handy for mailing or for carrying lantern slides conveniently in brief case or luggage, is described.

No.

86 REINHARDT, ROBERT M.
TRIS-(-CHLOROALLYL) PHOSPHATE. Amer. Chem. Soc. Jour. 74(4): 1093-1094. 1952.

Tris (-chloroallyl) phosphate has been prepared by reacting phosphorus oxychloride with -chloroallyl alcohol under conditions similar to those of Whitehill and Barker for the preparation of triallyl phosphate.

87 SKAU, EVALD L.
MELTING AND FREEZING TEMPERATURES. Encyclopedia of Chem. Technol. (Ed. by R. E. Kirk and D. F. Othmer.) Interscience Encyclopedia Inc., New York, Vol. 8. 839-857. 1952.

The subject is treated under the following headings: energy and volume changes at the melting point; effect of pressure; ideal

* New Orleans Branch, Department of Agriculture Library.

No.

freezing-point behavior; cooling and heating curves; the theory and interpretation of binary freezing point-composition diagrams for simple eutectic systems and for systems exhibiting the various types of compound and solid-solution formation; a description and critical discussion of the various experimental methods for determining the freezing points of pure compounds and mixtures; determination of molecular weights by freezing-point depression; the use of freezing-point determinations as a criterion of purity; anomalous melting points caused by polymorphism, dynamic isomerism, and liquid crystal formation; the relationship between melting point and structure for elements and for inorganic and organic compounds; and applications of the melting and freezing process.

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The holder is made of sheet brass and grips the thermometer stem by spring tension. As many as 5 capillary tubes may be inserted at one time.

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